Technical Document 2385
November 1992

Toward the MIL-STD and MIL-HDBK for Project Support Environment Interfaces

DTIC
ELECTE
DEC 0 2 1992
S
A
D

Project Support Environment Standards
Working Group of the Next Generation
Computer Resources Program
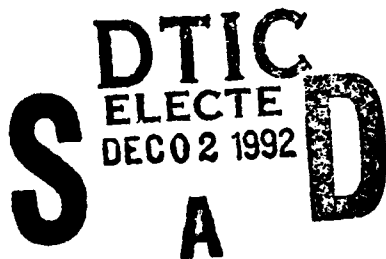
424521

92-30565

NRaD

92 12 01 026

Technical Document 2385
November 1992

Toward the MIL-STD and MIL-HDBK for Project Support Environment Interfaces

Project Support Environment Standards Working Group
of the Next Generation Computer Resources Program

ADMINISTRATIVE INFORMATION

This report #1 was prepared by the Project Support Environment Standards Working Group (PSESWG) of the Next Generation Computer Resources (NGCR) Program. This document was prepared for the Commander, Space and Naval Warfare Systems Command (SPW-03Y), Washington, DC 20363-5100, under program element OMN.

Send comments or corrections to both:

Carl Schmiedekamp
Chair, Standards Writing Group
Naval Air Warfare Center
Aircraft Division
Code 7033
Warminster, PA 18974-5000
(215) 441-1779
FAX: (215) 441-3225
carls@nadc.navy.mil

Michael D. Shapiro
Technical Editor
NCCOSC RDT&E Division
(NRaD)
Code 411
San Diego, CA 92152-5000
(619) 533-4080
FAX: (619) 553-4808
mshapiro@nosc.mil

SUMMARY

The Project Support Environment Standards Working Group (PSESWG) of the Navy's Next Generation Computer Resources (NGCR) Program was chartered to define a profile of interface and related standards to be used in the acquisition of support environments for systems engineering and life-cycle support. The principal products of the effort will be the creation of a military standard (MIL-STD) and military handbook (MIL-HDBK) project support environment interfaces (PSEI) to be used for these purposes. This report is the first in an anticipated series tracking the progress toward these products.

The main text of this report provides background information and charts the history of the project. Preliminary incomplete drafts of the standard and handbook appear as appendices A and B, respectively. Future versions of this report will update all the information as progress continues toward the goal.

Accesion For		
NTIS CRA&I	☑	
DTIC TAB	☐	
Unannounced	☐	
Justification		
By		
Distribution /		
Availability Codes		
Dist	Avail and / or Special	
A-1		

i

CONTENTS

1. INTRODUCTION

The first step in the standards process is identifying a few of the standards whose selection seems appropriate. The key criteria in deciding appropriateness are:

- The standards are expected to be widely accepted, easily available and in use throughout the environments community by the mid 1990s.

- The standards are necessary for the acquisition of a full project support environment (PSE).

- The functionality of the standards does not greatly affect the essential characteristics of a PSE or the future selection of other standards that may prove to be of interest.

At the November 1991 and the February 1992 meetings of the PSESWG, a few such standards were identified and accepted by the group. This report documents those selections.

2. NGCR

The Navy has a long history of developing and using standard computer products. When computer technology was in its infancy, the Navy wielded significant influence in the market, setting its own requirements and developing its own computer designs, including instruction set architectures (ISAs). Standard computer implementations (i.e., buying "boxes") and upward compatible ISAs have been the foundation of the Navy's computer policy. This policy has been motivated by the fact that software can adapt a common computer design to meet many different applications.

But the Navy's current computer standardization approach has difficulty remaining technologically competitive in today's environment of rapidly improving technologies. The Navy acquisition and budget process in the past has taken a long time to field new standard computers, so long that the produced technology is often old compared to commercial technology. The obvious logistics benefits associated with standard hardware are offset by the inability to field current technologies.

Thus, the objective of the Next Generation Computer Resources (NGCR) program is to restructure the Navy's approach to acquisition of standard computing resources to take better advantage of commercial advances and investments. This new approach should result in reduced production costs (through larger quantity buys), reduced operation and maintenance costs, avoidance of replication of Navy RDT&E costs (for separate projects to develop similar computing capabilities), and more effective system integration.

The proposed new approach is an open systems approach based on the establishment of commercially based interface standards in six areas: multisystem interconnects,

1

multiprocessor interconnects, operating systems, database management systems, project support environments, and graphics standards.

The NGCR interface standards will be based on existing industry standards with multivendor support. In cases where existing industry standards do not fully meet Navy needs, the approach is to further enhance the existing standards jointly with industry; thus, assuring a widely accepted set of commercially based interface standards.

Application of these interface standards will change the Navy's approach from one of buying standard computers to one of procuring commercial computing resources that satisfy the interfaces defined by the standards. These standards will be applied at the project level rather than at a Navy-wide procurement level.

2.1 NGCR PSESWG

The U.S. Navy has embarked on the NGCR program to fulfill the Navy's need for standard computing resources. The program revolves around the selection of interface standards in six areas. One of these areas is project support environments (PSEs). The projects that the environments will support are for developing, enhancing, or maintaining computer-based systems or products. These interface standards should be useful for · projects focused primarily on software development, hardware development, or the concurrent development of hardware and software.

The effort to establish the PSE interface standards was initiated at the start of 1991 and draws heavily on industry expertise. All NGCR standardization efforts are accomplished by working groups with strong industrial, academic, and government participation. The final PSE interface standard will refer to new and existing environment interface standards and will be usable in procuring Navy systems in 1998 and beyond. The initial focus of PSESWG (pronounced "Peace Wig") is in identifying those areas of support environments that should have standardized interfaces and for which industry-accepted interface standards can be available within the project's timeframe.

2.2 PSESWG COMPOSITION

The PSESWG has been organized into subgroups and teams. The subgroups are Reference Models, Available Technology, and Approach. The Reference Models subgroup is working in cooperation with the National Institute of Standards and Technology (NIST) Integrated Software Engineering Environment (ISEE) group to produce a full environment reference model. PSESWG intends to use the model for identifying PSE interface requirements and describing PSE technology. The Available Technology Subgroup is collecting and reviewing descriptions of existing environment interface technology. The Approach Subgroup is planning the organization and operation of PSESWG, including procedures for selecting baseline standards.

The PSESWG has recently organized teams more focused upon standard production and specific technology areas. PSESWG members generally participate in one subgroup and one team. The initial teams are Data Interfaces, Framework, and Standard and Handbook Writing. The Data Interfaces Team is tasked with investigating the data interchange technology area and its subareas, producing an interface requirements document for the technology and producing a list of candidates for selection as part of developing the standard. The Framework Team has similar tasks to the Data Interfaces Team for the Framework technology area. The Standard and Handbook Writing Team is tasked with actually writing the draft military standard and handbook.

3. PSESWG STANDARD

The project support environment interface (PSEI) standard will not define standard tools or tool sets for use in Navy system development. Instead, the focus is on tool integration mechanisms, data exchange mechanisms, and the logical contents of project data repositories. An integrated (harmonized) set of environment interface standards is important in the success of NGCR. Technically, the adoption of standards for PSE interfaces, services, and protocols will provide means for better integration within a PSE and better interaction between different PSE implementations. Procurement of PSEs will be aided by making their specification easier and by lowering costs for common PSE components.

4. SCOPE OF NGCR PSE

The final PSESWG result will be "an interface" that is really a collection of interfaces. Each interface of interest represents the provision of some service or an agreement on some format between two elements of a PSE. If the interfaces are correctly defined, they will increase the probability that project personnel can create a PSE suitable for their project by mixing and matching products from a variety of vendors. To accomplish this goal effectively, all PSESWG participants must first reach a common understanding of what is meant by a PSE and what its potential scope and requirements are. The approach in this section is to examine each of those words—project, support, environment, interface, and standard—one at a time and to discuss what is meant by each of them.

4.1 PROJECT

Everyone on the PSESWG has been involved in a project at sometime during his or her career. Every project has been quite different, but all such projects have also had some important characteristics in common:

- one or more people have been working together to develop, enhance, or maintain a computer-based system or product

3

- some level of management has been necessary (even if it's only self-discipline)

- computer resources have been employed to support the process

- communications are required (even if it's only an individual reporting to the supervisor)

- the system or product has a lifetime during which it passes through one or more stages or phases; a given project may encompass one or more of these phases

These are examples of the characteristics that make "projects" of interest to the PSESWG. Note that these characteristics are not limited only to software engineering projects, but are intended to include hardware and firmware projects as well.

4.2 SUPPORT

Projects require a wide range of support. Most of the recent work investigating what constitutes appropriate support for projects has concentrated on the processes used to achieve the goals of the project. Viewed as support for these processes, the support functions of interest to projects can be grouped in a few major categories:

- technical development phases

- management functions

- technical management functions

- general support functions

- human factors

These functions constitute the notion of "support" that are the main concern of the PSESWG.

4.3 ENVIRONMENT

Perhaps the most difficult question in determining the scope of the PSESWG effort is to come to agreement on what constitutes an "environment." Although the ideas of (I)PSEs ([integrated] project support environments, a.k.a. software development environments [SDEs], software support environments [SSEs], software factories, etc.) often come from the software engineering community, there are equally important, similar efforts being pursued in the context of hardware and firmware support environments. The key element that all seem to have in common is that they are promoting the use of automation to support the processes of projects.

In general, "support" can be provided by automated or manual means. In particular, the support that is of interest to the PSESWG is that which is computer-based. Examples of this are computer-based tools and databases. Thus, a manual checklist in a three-ring binder is not within the scope until or unless it is generated or used by some automated tools. A telephone conversation about a step in the project process is not within the scope either, although the same conversation carried on via e-mail (or captured electronically in another fashion) is.

Another aspect to consider concerns what "parts" of the automation fall within the PSESWG scope. When confronted with the question, "What is your environment like?" most people begin by listing the available tools. However, those tools are supported by an elaborate set of capabilities, such as operating systems, local area networks, and database management systems. For purposes of the NGCR program, whose objective is to standardize interfaces, it is these capabilities that lie outside the tools and whose functions are to support the tools in various ways that are of interest, not the tools themselves. Tools are important in that they help us to understand the interfaces on which they are dependent and which, therefore, should be considered for standardization, not because we are interested in choosing standard tools. Also of interest are discovering and discussing the interfaces between tools, since the interfaces play as large a role in successfully porting tools as the underlying interfaces of the operating system.

4.4 INTERFACE

The final PSESWG result will be a collection of interfaces. Each interface of interest represents the provision of some service or an agreement on some format between two elements of a PSE. The interfaces may be intended for use between two tools or between tools and the environment framework. If the interfaces are defined correctly, they will increase the probability that project personnel can create a PSE suitable for their project by mixing and matching products from a variety of sources, i.e., the interfaces should be independent of any vendor's products, including hardware.

In this collection of interfaces, there may be many different types of interfaces, but the essential characteristic that all will have in common is that they promote some aspect of concern in building project support environments that are more useful and affordable.

One such aspect is the support of tool portability. Interfaces that support this goal make it easier for vendors to create tools that can function effectively in many different computing contexts without major modifications.

Another aspect is the support of interoperability between PSEs. This primarily involves the ease with which data can be exchanged between PSEs. Such data exchange ranges from one-time batch-like transfers (e.g., when moving a project from a development

activity to a life-cycle maintenance organization) to dynamic, online communication between two cooperating environments.

A third aspect is the support of intertool interoperability. This involves the ease with which tools can exchange and use common data. This is critical in achieving integrated toolsets and often decides how easy or difficult it is for users to make productive use of an environment.

A fourth aspect is the support of user portability. This goal has several dimensions. It includes the "familiarity" of screens and function keys across different elements of the environment or between different environments. It also includes interfaces that may only be of concern when a system administration person or an environment adaptor is expected to move between several independent PSEs and still function, using common capabilities.

The last aspect is the support of integration. This notion is still undergoing a great deal of definition and refinement, but it is generally accepted there are at least three kinds of integration that affect the utility of a PSE: control and process integration, data integration, and presentation integration. Although the mechanisms and, in particular, the interface features that accomplish integration may often be mechanisms for also achieving other goals listed here, there may be some such mechanisms that are unique to the goal of integration.

It is not the goal of the PSESWG to define every interface that system development project personnel would need to define a full environment. Many interfaces would not significantly support any of the aspects above or serve enough potential users to make it feasible to establish them for everyone. Others are too immature technologically or are not yet the subject of any recognized industry effort, making it unreasonable to try to define a widely acceptable interface now. Even many years in the future, there will still be the need for users of the PSESWG interfaces to do some of their own work, to augment the interface collection in ways that are peculiarly necessary for each individual project. But the commonality of interfaces achieved by adherence to the PSESWG interface collection should go a long way in making a system development project personnel's job easier.

4.5 STANDARD

The goal of the NGCR PSESWG is to provide a military standard that can be used by project personnel as an aid in procuring or assembling a project support environment that will meet the needs of a particular project. It will consist of several widely accepted, industry-based interface standards. These will have·been studied and evaluated together as a group to ensure their compatibility and consistency and their ability to support a wide

ange of PSE needs. The final standard will most likely be a profile, a document that not only cites "functional" (i.e., providing new functionality) standards, but also selects options, limits ranges of acceptable behavior, and puts other restrictions on the cited standards to make it possible for them to function together coherently as a set.

The standards on which it is based will be existing industry standards to the greatest extent possible. To be of most value for the purposes of NGCR, these industry standards should be the result of public, "open" processes. Open here means the process has been one in which anyone can participate and is driven by broad-based consensus. For NGCR PSESWG, this sense of openness applies at two levels: not only should the industry standards selected be the results of open processes, but the PSESWG itself will use an open process to make the selections.

5. PLANNED ACTIVITIES AND GOALS

5.1 TECHNOLOGY AREAS BEING CONSIDERED

The following outline illustrates the many PSE service interfaces being considered for inclusion in the MIL-STD-PSEI. The outline also illustrates the overlap of functionality among categories that must be organized by PSESWG during development of the MIL-STD-PSEI. These service interfaces are the result of combining categories in the PSESWG Available Technology Report, the PSESWG Environment Reference Model, and the categories of existing standards considered for early inclusion in the Draft MIL-STD-PSEI.

> Framework Services
>
> Operating Systems Services
>
> Object Management Services
>
>> Data Repository Services
>>
>> Data Integration Services
>>
>> General/Metadata Data
>>
>> Common Repository/Object Management
>>
>> Administration, Commerce, and Transportation Data
>>
>> Documentation Data
>>
>> Electronic Design Data
>>
>> Graphics Data
>>
>> Data Interoperability
>>
>> Hardware Design Data

Interface Description Data

Product Description Data

Software Engineering Data

Software Engineering-Front-End Data

Software Engineering-Program Library Data

Time Data

Others

Process Management Services

Interservice and Intertool Communication Services

User Interface Services

User Interface Protocols

User Interface Toolkits

Graphics Interfaces

Network Services

Task Management Services

Groupware Services

Security Services

Other Services

Technical Engineering Services

Technical Management Services

Project Management Services

Support Services

5.2 PROCESS

PSESWG will select additional standards and work to make the MIL-STD-PSEI a consistent, usable, "coherent" profile. The process PSESWG will use to select standards for inclusion in later revisions of the Draft MIL-STD-PSEI contains five major steps:

1. Technology Area Definition

2. Requirements Definition

3. Technology Survey

4. Candidate Evaluation

5. Baseline Selection

These steps begin with the definition of a small, comprehensible technology area that can be investigated. The Navy's requirements in that area are then collected and documented. Also, available standards (*de jure* and *de facto*) that apply to this technology area are collected and documented. The requirements lead to a set of evaluation criteria by which the candidate standards are evaluated. Finally, the selection of one or more standards for the particular technology area is made.

Once a set of baseline standards is available, the work of producing a usable, workable, "coherent" profile begins. One part of this profiling work is the specification in the MIL-STD-PSEI of some options, parameters, and undefined values that are user- or implementation-defined in the base standard. These specifications of options, etc. may arise out of a need to achieve more interoperability or portability in systems complaint with the MIL-STD-PSEI or to reduce the negative effects of interactions among the various base standards. Part of the profiling work is to investigate these interactions among the various base standards in the Draft MIL-STD-PSEI with the intent of identifying problems when the standards are used together. Solutions to interaction problems also include describing procurement and/or implementation techniques in the Draft MIL-HDBK-PSEI. This profiling work may also suggest the need for PSESWG involvement in the standards bodies revising the base standards so that Navy needs will be considered in any changes made to the base standard.

5.3 PLANNED REVISIONS TO DRAFT STANDARD

The PSESWG will release, for public review, revisions of the Draft MIL-STD-PSEI and the Draft MIL-HDBK-PSEI every twelve to 18 months.

6. GLOSSARY

COTS	commercial off-the-shelf
de jure	(Lat.) according to law
de facto	(Lat.) in reality
FIPS	Federal Information Processing Standard
GOSIP	government open systems interconnect profile
GOTS	government off-the-shelf
IEEE	Institute of Electrical and Electronic Engineers
ISA	instruction set architectures
ISEE	Integrated Software Engineering Environment
MIL-HDBK	military handbook
MIL-STD	military standard
NAWC	Naval Air Warfare Center
NCCOSC	Naval Command, Control and Ocean Surveillance Center
NGCR	Next Generation Computer Resources
NIST	National Institute of Standards and Technology
NRaD	Naval Command, Control and Ocean Surveillance Center, RDT&E Division
PHIGS	Programmer's Hierarchical Graphics System
POSIX	Portable Operating System Interface
PSE	project support environment
PSEI	project support environment interfaces
PSESWG	Project Support Environment Standards Working Group
PUB	publications
RDT&E	research, development, test, and evaluation
SDE	software development environments
SSE	software support environments

APPENDIX A. PRELIMINARY PROPOSED MIL–STD–PSEI

This appendix contains preliminary text for the proposed military standard for project support environment interfaces (MIL–STD–PSEI). It also contains (printed in italics) descriptions of information to go into the text. In future reports, this appendix will be expanded to provide more complete information. When completed, the information in this appendix will be issued as a MIL–STD document. This draft does not conform to the format required for such documents. For example, a row of hyphens represents a page break. Before issuing, the document will first be made to conform to MIL–STD–962B, *Military Standard: Military Standards, Handbooks, and Bulletins, Preparation of.*

FOREWORD

The foreword will contain required material shown in paragraph 5.4 of MIL–STD–962B, adapted to this document. It will also include discussion of standard development.

CONTENTS

The contents page will be prepared in accordance with paragraph 5.5 of MIL–STD–962B. Entries will include sections, paragraphs, figures, tables, appendices, and index.

1. Scope

2. Applicable Documents

3. Definitions

4. General Requirements

5. Detailed Requirements
    5.1 Operating System
    5.2 Operating System Shell and Utilities
    5.3 Graphic User Interface Protocol
    5.4 Multisystem Interconnects
    5.5 Graphics

6. Notes

Appendices

Index

Concluding Material

1. SCOPE

This standard provides requirements to be used in procuring or assembling a project support environment (PSE) for a particular project or organization. The standard consists of several interface standards chosen for their compatibility and consistency and for their ability to support a wide range of PSE. Industry standards are used whenever possible, promoting use of commercial off-the-shelf (COTS) and government off-the-shelf (GOTS) products.

This standard is an interface that is really a collection of interfaces. Each interface of interest represents the provision of some service or an agreement on some format between two elements of a PSE. Correctly defined interfaces increase the probability that project personnel can create a PSE suitable for their project by mixing and matching products from a variety of vendors.

Additional paragraphs described in paragraph 5.6 of MIL–STD–962B will be included as appropriate.

2. APPLICABLE DOCUMENTS

This section will list documents referenced in sections 3, 4, and 5 of this document. These references will include both government documents and non-government documents. It will also include a statement intended to avoid confusion in the event of a conflict between the requirements of this document and the referenced documents.

3. DEFINITIONS

This section will contain the definitions of all key terms used in this standard. These definitions will begin with a list of acronyms.

4. GENERAL REQUIREMENTS

The project support environment interface (PSEI) standard defines the tool integration mechanisms, data exchange mechanisms, and the logical contents of project data repositories. It describes an integrated (harmonized) set of environment interface standards, an important requirement of NGCR. Technically, the adoption of standards for PSE interfaces, services, and protocols will provide a means for better integration within a PSE and better interaction between different implementations. Procurement of PSEs will be aided by making their specification easier and by lowering costs for common PSE components.

This standard does not define standard tools or tool sets for use in Navy system development.

The general requirements will also include statements on general conformance and on tailoring of the standard.

5. DETAILED REQUIREMENTS

5.1 OPERATING SYSTEM

5.1.1 Standard

The standard operating system interface shall be as specified in Federal Information Processing Standard Publications (FIPS PUB) 151-1 Portable Operating System Interface (POSIX).

5.1.2 Profiling

This section will discuss profiling requirements for the standard.

5.1.3 Conformance

This section will discuss conformance testing to the standard.

5.1.4 Tailoring

This section will discuss tailoring of the standard for specific uses.

5.2 OPERATING SYSTEM SHELL AND UTILITIES

5.2.1 Standard

The standard operating system shell and utilities shall be as specified in Institute of Electrical and Electronic Engineers (IEEE) P1003.2* and IEEE P1003.2a.*

5.2.2 Profiling

This section will discuss profiling requirements for the standard.

5.2.3 Conformance

This section will discuss conformance testing to the standard.

---

*The actual standards are in preparation and will be referenced when published.

5.2.4 Tailoring

This section will discuss tailoring of the standard for specific uses.

5.3 GRAPHIC USER INTERFACE PROTOCOL

5.3.1 Standard

The graphic user interface protocol shall be as specified in FIPS PUB 158 (X Window).

5.3.2 Profiling

This section will discuss profiling requirements for the standard.

5.3.3 Conformance

This section will discuss conformance testing to the standard.

5.3.4 Tailoring

This section will discuss tailoring of the standard for specific uses.

5.4 MULTISYSTEM INTERCONNECTS

5.4.1 Standard

The multisystem interconnect standard shall be as specified in FIPS PUB 146–1 (Government Open Systems Interconnect Profile [GOSIP]).

5.4.2 Profiling

This section will discuss profiling requirements for the standard.

5.4.3 Conformance

This section will discuss conformance testing to the standard.

5.4.4 Tailoring

This section will discuss tailoring of the standard for specific uses.

5.5 GRAPHICS

5.5.1 Standard

The graphics standard shall be as specified in FIPS PUB 153 (Programmer's Hierarchical Graphics System [PHIGS]).

5.5.2 Profiling

This section will discuss profiling requirements for the standard.

5.5.3 Conformance

This section will discuss conformance testing to the standard.

5.5.4 Tailoring

This section will discuss tailoring of the standard for specific uses.

6. NOTES

Notes will be added as specified by paragraph 5.11 of MIL-STD-962B.

APPENDICES

Appropriate appendices will be added in this section as needed.

INDEX

This section will contain an index for this document.

CONCLUDING MATERIAL

Concluding material will be added as specified in paragraph 5.12 of MIL-STD-962B.

APPENDIX B.   PRELIMINARY PROPOSED MIL–HDBK–PSEI

This appendix contains preliminary text for the proposed military handbook for project support environment interfaces (MIL–HDBK–PSEI). The MIL–HDBK–PSEI is intended to accompany MIL–STD–PSEI to help explain its application. It also contains (printed in italics) descriptions of information to go into the text. In future reports, this appendix will be expanded and provide more complete information. When completed, the information in this appendix will be issued as a MIL–STD document. This draft does not conform to the format required for such documents. For example, a row of hyphens represents a page break. Before issuing, the document will first be made to conform to MIL–STD–962B, *Military Standard: Military Standards, Handbooks, and Bulletins, Preparation of.*

More information will be added as appropriate.

FOREWORD

The foreword will contain required material shown in paragraph 5.4 of MIL–STD–962B, adapted to this document.

CONTENTS

The contents page will be prepared according to paragraph 5.5 of MIL–STD–962B. Entries will include sections, paragraphs, subparagraphs, figures, tables, appendices, and index.

1. Scope

2. Applicable Documents

3. Definitions

4. General Requirements

5. Detailed Requirements
    5.1 Operating System
    5.2 Operating System Shell and Utilities
    5.3 User Interface Protocol
    5.4 Multisystem Interconnects
    5.5 Graphics

6. Notes

Appendices

Index

Concluding Material

1. SCOPE

This handbook provides guidance and information used in the design, engineering, production, acquisition and supply management operations for project support environments compliant with MIL-STD-PSEI.

2. APPLICABLE DOCUMENTS

This section will reference MIL-STD-PSEI and other applicable documents.

3. DEFINITIONS

This section will contain definitions of any terms used in this document but not described in section 3 of the MIL-STD-PSEI.

4. GENERAL REQUIREMENTS

This section gives guidance corresponding to the General Requirements of MIL-STD-PSEI and other guidance of a general nature.

5. DETAILED REQUIREMENTS

This section gives guidance corresponding to the Detailed Requirements of MIL-STD-PSEI. The following paragraph illustrates the contents of the paragraphs in this section.

5.1 OPERATING SYSTEM

POSIX provides low level services, typical of an operating system, necessary to create and manage processes, execute programs, define and communicate signals, define and process system clock operations, manage files and directories, and control input-output processing to and from external devices.

5.2 OPERATING SYSTEM SHELL AND UTILITIES

This section will contain notes for this document.

5.3 USER INTERFACE PROTOCOL

This section will contain notes for this document.

5.4 MULTISYSTEM INTERCONNECTS

This section will contain notes for this document.

6. NOTES

Notes will be added as specified by paragraph 5.11 of MIL–STD–962B.

APPENDICES

Appropriate appendices will be added in this section as needed.

INDEX

This section will contain the index for this document.

CONCLUDING MATERIAL

Concluding material will be added as specified in paragraph 4.12 of MIL–STD–962B.

REPORT DOCUMENTATION PAGE

reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and nining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including stions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

NCY USE ONLY (Leave blank)	2. REPORT DATE November 1992	3. REPORT TYPE AND DATES COVERED Final: 30 September 1992

E AND SUBTITLE WARD THE MIL-STD AND MIL-HDBK FOR PROJECT SUPPORT VIRONMENT INTERFACES	5. FUNDING NUMBERS PE: OMN PROJ: 41-CC30-01 ACC: DN587574

HOR(S) Schmiedekamp and M. D. Shapiro	

FORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ral Command, Control and Ocean Surveillance Center (NCCOSC) T&E Division (NRaD) Diego, CA 92152-5000	8. PERFORMING ORGANIZATION REPORT NUMBER NRaD-TD-2385

NSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) nmander Space and Naval Warfare Systems Command W-03Y) shington, DC 20363-5100	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

PPLEMENTARY NOTES

ISTRIBUTION/AVAILABILITY STATEMENT proved for public release; distribution is unlimited.	12b. DISTRIBUTION CODE

ISTRACT (Maximum 200 words)

This document provides the necessary background information to create a military standard (MIL-STD) and itary handbook (MIL-HDBK) for the project support environment interfaces (PSEI). Preliminary incomplete drafts of the L-STD and MIL-HDBK are included as appendices A and B respectively.

JBJECT TERMS ject support environment (PSE), interfaces, military standard (MIL-STD), military handbook IL-HDBK), standards	15. NUMBER OF PAGES 27
	16. PRICE CODE

CURITY CLASSIFICATION REPORT ICLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAME AS REPORT

L NAME OF RESPONSIBLE INDIVIDUAL	21b. TELEPHONE *(Include Area Code)*	21c. OFFICE SYMBOL
Dr. M. D. Shapiro	(619) 553-4080	NRaD Code 411